THE ROLE OF SENSE OF COHERENCE AND PHYSICAL ACTIVITY IN POSITIVE AND NEGATIVE AFFECT OF TURKISH ADOLESCENTS

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ABSTRACT

This study investigated the role of sense of coherence and total physical activity in positive and negative affect. Participants were 376 (169 female, 206 male, and 1 missing value) student volunteers from different faculties of Middle East Technical University. Three questionnaires: Sense of Coherence Scale (SOC), Physical Activity Assessment Questionnaire (PAAQ), and Positive and Negative Affect Schedule (PANAS) were administered to the students together with the demographic information sheet. Two separate stepwise multiple linear regression analyses were conducted to examine the predictive power of sense of coherence and total physical activity on positive and negative affect scores. Results revealed that both sense of coherence and total physical activity predicted the positive affect whereas only the sense of coherence predicted the negative affect on university students. Findings are discussed in light of sense of coherence, physical activity, and positive and negative affect literature.

The increased interest in positive psychology has shifted the focus of research from factors that limit health to those that promote health (Ironson & Powell, 2005). Within positive psychology, affectivity has been considered one of the components of well-being which has been proposed to be measured not only by negative affect but by positive affect (Watson, Clark, & Telegen, 1988). It was considered that these two affect states are not opposite to each other but are distinctive dimensions with high positive affect referring to a state of high energy, full concentration, and pleasurable engagement whereas the low negative affect is a state of calmness and serenity. In the literature, individuals' general disposition of experiencing positive or negative mood states has been found to be consistently associated with a physical and

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psychological health-related quality of life (Brennan, Singh, Spencer, & Roberts-Thomson, 2006). Examination of the related literature seems to suggest that certain personality dispositions and health-promoting behaviors such as exercise make significant contributions to enhancement of quality of life. In the present study, sense of coherence as a personality variable and total physical activity as a health-promoting behavior were examined together in terms of their role in positive and negative affect among male and female late adolescents.

The term salutogenesis (origins of health) was first used by Aoron Antonovsky in place of the term pathogenesis (origins of disease) (Almedom, 2005). Arising from a salutogenic approach which emphasizes the factors that support health and well-being, Antonovsky (1979, as cited in Lindström & Eriksson, 2005), proposed the concept of sense of coherence to explain why some people stay healthy and others become ill under stress. He argued that the sense of coherence, which is defined as the way individuals view their life and their essence of existence, is the reason for their ability to stay healthy. Antonovsky identified three components of the concept of sense of coherence: comprehensibility, manageability, and meaningfulness. Comprehensibility refers to the perception of the world as being understandable, meaningful, orderly and consistent rather than chaotic, random, and unpredictable. Manageabillity is the recognition that the resources required to meet the demands are available. Meaningfulness is the emotional experience of life as making sense and thus coping being desirable (Lindström & Eriksson, 2005). A strong sense of coherence (SOC), which is a measurement of the whole concept rather than measuring the three sub-concepts separately seems to help people make use of their resources, promote effective coping, and resolve tension in a salutary manner (Antonovsky, 1979, as cited in Sullivan, 1993). It was also reported that SOC is stabilized by the end of early adulthood and afterwards, it does not fluctuate significantly (Antonovsky & Sagy, 1986).

For the last decades, many studies have been conducted to examine the possible effects of sense of coherence on several physical- and mental health-related concepts. In review studies, researchers reported that sense of coherence is strongly and negatively associated with fatigue, loneliness, anxiety, anger, burnout, demoralization, hostility, hopelessness, depression, perceived stressors, and post-traumatic stress disorder (Kuuppelomaki & Utriainen, 2003; Eriksson, Lindström, & Lija, 2007). More specifically, high SOC was found to be related to adaptive coping strategies and resilience (Zayne, 1997) and effective for coping with severe illnesses, such as gynecological cancer

(Boscaglia & Clarke, 2007) and posttraumatic stress (Frommberger et al., 1999). Similarly, it was found that SOC is important in increasing the quality of life of individuals with mental (e.g., schizophrenia) and physical (e.g., coronary heart disease) illnesses which also implies the presence of some adaptive way of coping with the source of stress (Eriksson & Lindström, 2007). In one study (Kravetz, Drory, & Florian, 1993), a considerable overlap between sense of coherence and negative affectivity was reported. The relationship between sense of coherence and positive health behaviors was also supported by the research (e.g., Frenz, Carey, & Jorgensen, 1993), indicating that people with higher SOC scores are more likely to engage in health-promoting behaviors (e.g., exercise) and less likely to engage in health-damaging behaviors (e.g., drinking).

Physical exercise is one of the most commonly used health behaviors to explain mental health, together with salutogenic personality factors (Kobasa, Maddi, & Puccetti, 1982). Singer, Hausenblas, and Janelle (2001) identified different paths in explaining how physical activity enhances mental health through preventing abnormal psychological states and enhancing psychological variables, such as anxiety, depression, cognitive functioning, stress reactivity, mood, affect, and self-esteem. The first path through which exercise enhances mental health is its capacity to reduce anxiety. A second path is its antidepressant effect. A third path is that exercise seems to be important in regulating the effects of stress. Researchers found significant differences between exercisers and non-exercisers in terms of their ability to recover after experiencing a psychological stressor (Singer, Hausenblas, & Janelle, 2001). Studies of the relationship between exercise and some mental health-related variables found that physical activity was related to enhanced positive mood in women during menopause (Elavsky & McAuley, 2007) and with improved mood in the elderly (Arent, Landers, & Etnier, 2000). A study by Watson (1988) conducted with university students revealed that exercise is related to positive affect more than negative affect in non-clinical populations.

Although the effects of exercise on psychological health has been widely studied in recent years, exercise has been considered a component of a broader construct, i.e., total physical activity, which includes activities involved in different dimensions of life such as work, school, transportation, and house-related activities together with exercise behavior. As suggested by some researchers (Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006), exercise as a leisure activity is not sufficient to explain the perceived effect on stress but total physical activity indexes would be better used to explain these complex con-

structs since they are more comprehensive. In other words, it is not preferable to reduce the physical activity construct to exercise behavior only. Based on those recent trends and suggestions, in the present study, not only the measure of exercise but the total measures of physical activities which include exercise were used to reach more comprehensive understanding of their role in positive and negative affect on university students.

In sum, the literature suggests that sense of coherence and physical activity are significant in explaining psychological health. Based on these findings, sense of coherence and physical activity are considered two components which might be beneficial to mood-affect regulation which is operationally defined as high positive affect and low negative affect in the present study. Thus, this study examined the predictive powers of sense of coherence and total physical activity on positive and negative affect among male and female university students. It was expected that both sense of coherence and total physical activity would predict positive and negative affect. Gender was also controlled to check its role in these relationships.

METHOD

Participants

Participants were 376 (169 female, 206 male and 1 missing value for gender) student volunteers from different faculties of Middle East Technical University. The students were taking the three service courses offered by the Department of Psychology and Educational Sciences in which there were many students from different grades and departments. Age of the students ranged from 18 to 30 with a mean of 22.1 (SD = 1.62).

Measures

Measure of physical activity. The Physical Activity Assessment Questionnaire (PAAQ) was originally developed by Karaca, Ergen, and Koruç (2000) to measure the physical activity level of individuals in the Turkish population. The PAAQ consists of 7 sub-scales of activities in which the individuals are expected to engage during a week. These sub-scales are related to the activities involved in work, school, hobbies, home, transportation, climbing stairs, and sports. For each subscale participants were asked to report frequency and duration of the given activity. Total scores were calculated for each individual by using the syntax prepared by the test developer. The higher the scores, the

more physically active they are. The measurement unit for the scale was MET/hour in which MET stands for "metabolic equivalent" and defined as the energy expenditure for sitting quietly (Ainsworth et al., 1993).

The validity and reliability studies of the PAAQ were conducted by Karaca, Ergen, and Koruç (2000), and Karaca (2007). As for the concurrent validity, correlation between the total score of the PAAQ and the Physical Activity Diary was reported as $r = .72$. Results of the test-retest reliability coefficients were reported as changing between .36 and .73 among the subscales of the scale. Cronbach alpha reliability coefficients reported for the MET/hour indices were; .36 for work, .58 for transportation, .62 for stairs, .39 for house, .70 for sports, and .40 for the total score. In the present study, internal consistency coefficients calculated by Cronbach alpha formula for the subscales ranged from .41 to .73. Cronbach alpha coefficient for the total score was .78.

Measure of sense of coherence. The Sense of Coherence Scale (SOC) was originally developed by Antonovsky in 1987 to measure individuals' ability to maintain healthy despite stress (as cited in Eriksson & Lindström, 2005). Antonovsky revised and developed a short version of the SOC scale which is composed of 13 items. In this short version, five items measure "comprehensibility," four items measure "meaningfulness," and four items measure "manageability" on a 7-point Likert type scale. Higher total scores indicate a higher sense of coherence. Eriksson and Lindström (2005), after examining 458 scientific publications and 13 doctoral theses, reported that the internal consistency of SOC-13 total score ranged from .70 to .92; and the test-retest reliability ranged from .69 to .72 for a one-year period.

The SOC scale was translated into Turkish by Lajunen and his research team (unpublished manuscript) and this translation was used in the present study. The total scores participants can obtain changes between 1 and 7. Higher total scores indicate a higher sense of coherence. For the reliability of the Turkish translation of the SOC-13 version, Lajunen reported the reliability coefficient as .78 for the Turkish population. In the present study, the internal consistency coefficient calculated by Cronbach alpha formula for the total score of SOC-13 was .77.

Measure of positive and negative affect. The Positive and Negative Affect Schedule (PANAS) was originally developed by Watson, Clark, and Tellegen (1988). PANAS is composed of two subscales: positive affect (PA) and negative affect (NA). Each subscale is composed of ten mood-related adjectives. The positive affect mood adjectives are active, alert, attentive, determined, enthusiastic, excited, inspired, interested,

proud, and strong. The negative affect mood adjectives include afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared, and upset. Participants were asked to report the extent to which they were feeling as indicated in the item for the last two weeks. This is a 5-point Likert scale in which 1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely. High scores on each dimension reflect the experience of affect while low scores represent lack of that feeling. For both PA and NA the maximum score one can obtain is 50, while the minimum is 10. Watson, Clark, and Tellegen (1988) stated that PA and NA together, accounted for 68.7% of the total variance in general ratings. In the same study, internal consistency reliabilities were .88 and .87 and test-retest reliabilities were .68 and .71 for PA and NA, respectively when general time frame is used as a time instruction.

Reliability and validity studies of the Turkish version of PANAS were conducted by Gençöz (2000). Factor loadings for NA and PA were reported as changing between .46 - .76 and .48 - .74, respectively and these two factors explained 44% of the total variance. Gençöz reported the internal consistency for PA and NA as .86 and .83 and test-retest reliability as .54 and .40, respectively. In the present study, the internal consistency coefficients calculated by Cronbach alpha formula for PA and NA scales were .83 and .83, respectively.

Procedure

Data were collected in classroom settings during the regularly scheduled three service courses offered by the Educational Sciences and the Psychology Departments. The purpose of the research was explained to the students, and those who volunteered participated in the study. Administration of the instruments took approximately 30 minutes. Students' anonymity and confidentiality were guaranteed.

RESULTS

After the data-cleaning procedure, analyses were carried out with 364 (164 female, 199 male and 1 missing value of gender) students. The mean age of the participants was 22.1, with a standard deviation of 1.63. The means and standard deviations of PAAQ, SOC, and PANAS scores of female and male students are presented in Table 1.

As can be seen in Table 1, the mean scores of PAAQ, SOC, PA, and NA for the total sample were 1.6, 4.4, 32.5, and 21.3, with standard deviations of 0.18, 0.79, 6.72, and 6.67, respectively Results of *t*-tests yielded no significant gender differences in terms of the scores obtained

Table 1. Descriptive statistics and intercorrelations between study variables

	Female		Male		Total		Correlations		
Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	1	2	3
1. PAAQ	1.6	0.15	1.6	0.20	1.6	0.18			
2. SOC	4.4	0.81	4.3	0.77	4.4	0.79	.13*		
3. PA	32.4	6.80	32.6	6.71	32.5	6.72	.26**	.29**	
4. NA	21.0	6.74	21.6	6.61	21.3	6.67	-.04	-.54**	-.21*

* $p < .05$, *two tailed* ** $p < .01$, *two tailed*

Note. PAAQ: Physical Activity Assessment Questionnaire; SOC: Sense of Coherence Scale; PA: Positive Affect; NA: Negative Affect.

from the instruments (all $p > .05$). Correlation coefficients among the variables changed between $-.54$ (sense of coherence and negative affect) and .29 (sense of coherence and positive affect) in the total sample.

Two separate stepwise multiple linear regression analyses were conducted to examine whether physical activity and sense of coherence predict positive and negative affect. Gender was not entered into the equation since no significant differences were found between females and males in any of the variables.

Results of the first stepwise multiple linear regression analysis concerning the predictors of positive affect indicated that the regression equation related to the sense of coherence was significant, $R^2 = .09$, $F(1,343) = 31.77$, $p < .001$. This variable alone accounted for approximately 8% of the variance. Physical activity, being the second variable entered into the equation, was also significant with values of $R^2 = .13$, $F(1,342) = 19.59$, $p < .001$. This variable alone accounted for an additional 5% of the variance. In the analyses of Beta values, it was seen that the sense of coherence and total physical activity level significantly and positively predicted the positive affect with Beta values of $\beta = .263$, $p < .001$ ($t = 5.18$, $p < .001$) and $\beta = .224$, $p < .001$ ($t = 4.43$, $p < .001$), respectively. Overall, these results indicated that sense of coherence and total physical activity positively predicted the positive affect. Together they explained 13% of the variance in positive affect.

A second stepwise multiple linear regression analysis was conducted to examine how well the independent variables (sense of coherence and total physical activity level) predict the second dependent variable

which is the negative affect. Results showed that the regression equation with the sense of coherence was significant, $R^2 = .29$, $F(1,343) = 141.70$, $p < .001$. This variable alone accounted for approximately 29% of the variance. In the analyses of Beta values, it was seen that the sense of coherence significantly and negatively predicted the negative affect with a Beta value of $\beta = -541$, $p < .001$ ($t = -11.90$, $p < .001$). In sum, sense of coherence negatively predicted the negative affect. It alone explained 29% of the variance in negative affect. Physical activity made no significant contribution to the explanation of variance in the negative affect.

DISCUSSION

The purpose of this study was to determine the predictive power of sense of coherence and physical activity in explaining positive and negative affect. Two separate stepwise multiple linear regression analyses were conducted for each dependent variable; namely, positive affect and negative affect. The findings revealed that both sense of coherence and physical activity were significant predictors of positive affect whereas only sense of coherence significantly and negatively predicted negative affect.

The finding of the present study regarding the effect of sense of coherence on positive affect is supported by the results of most of the research in the literature. Although most of that research focuses on the relationship between sense of coherence and variables which mainly constitutes negative affect such as demoralization, helplessness, anxiety, depression, post-traumatic stress, and coping with severe illnesses (Eriksson, Lindström, & Lilja, 2007), researchers (Strümpfer, Gouws, & Viviers, 1998) generally concluded that sense of coherence is also related to positive affect although not as much as negative affect.

Another finding of the present study showed that physical activity significantly and positively predicts positive affect which is also consistent with the current literature. For example, Bartholomew, Laffrey, Kilpatrick, and Spina (2004) found that a single bout of exercise increased positive affect among older Mexican American women but does not decrease negative affect. Similarly, it was reported in one study (Watson, 1988), that social activity and exercise were more strongly related to positive affect whereas perceived stress was highly related to negative affect in the normal population. Another study (Steinberg et al., 1998) examining the successive and long-term effects of exercise

in negative and positive feelings, indicated that exercise significantly increased positive feelings and decreased negative feelings in successive weeks. Researchers concluded that exercise seemed to have a much greater effect on positive rather than on negative moods.

Results of the second stepwise multiple linear regression analysis indicated that sense of coherence was a significant predictor of negative affect. This finding of the present study is supported by most studies in the literature, indicating that sense of coherence predicts negative affect even more than it predicts positive affect (Strümpfer et al., 1988) and that there is a high correlation between sense of coherence and negative affect (Kravetz et al., 1993). From the literature on sense of coherence, it can be argued that this is not surprising since sense of coherence is found to be significant in mediating the effects of stress, chronic illnesses, and disabilities (Eriksson, Lindström, & Lilja, 2007) which are mainly related to negative affect rather than positive affect.

The finding that physical activity does not have a significant predictive role in negative affect might be regarded as surprising since many researchers have pointed out that exercise is effective in reducing anxiety, depression, stress, and regulating mood-affect (e.g., Singer et al., 2001). One possible explanation is that, in the present study, total physical activity measures were used rather than the mere exercise index, which is the most-used variable in the literature, making the results contradictory. A further explanation might also be that, as Hassmen, Koivula, and Uutela (2000) reported, exercise may be more related to mood improvement in the clinically depressed than in normal people. Therefore, it can be concluded that the antidepressant effect of exercise depends on the population and the presence or absence of depression. In fact, this was precisely what the present study found: sense of coherence mainly reduces the negative affect, and physical activity is effective in increasing the positive affect and together they elevate the affect state of individuals in the normal population.

Several implications may be drawn from the findings of this study. It is well documented in the literature that university students internationally spend most of their time studying and are not physically active enough (Butler, Black, Blue, & Gretebeck, 2004; Huang, Harris, Lee, Nazir, Born, & Kaur, 2003; Irwin, 2004; Racette, Deusinger, Strube, Highstein, & Deusinger, 2004). Thus, the university students should be made aware of the role of physical activity in regulating their emotions. They should be encouraged not only to participate in sports, but to increase their daily physical activity in all areas of life.

Another implication of this study is that if sense of coherence is a personality construct that can be *learned* (Lindström & Eriksson, 2006;

Morrison & Clift, 2006), then university counselors in particular should develop programs for promoting the sense of coherence of students since the university years are the most important for its development (Antonovsky & Sagy, 1986).

For future research, more empirical studies should be conducted using total physical activity indexes rather than mere exercise/sports indexes. As argued by the researchers (Nguyen-Michel et al., 2006) total physical activity indexes which include work, school, transportation, and house-related activities together with exercise behavior should be used to explain the complex relationship between physical activity and mental health of university students.

Finally, future studies should use random rather than convenience sampling. It is also recommended that future studies use objective measurements other than self report in order to enhance the validity of the findings.

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